

**From:** [Tzhone, Stephen](#)  
**To:** [Fleer, James](#); [Moix, Mark](#); [Huling, Scott](#); [Harte, Philip](#); [Telisak, Theodore](#); [Snyder, Jay](#)  
**Cc:** [Sanchez, Carlos](#)  
**Subject:** FW: dioxin gw question; RE: colloid vs suspended solids (turbidity) - role in facilitated dioxin transport  
**Date:** Wednesday, January 13, 2016 7:42:00 AM  
**Attachments:** [Arkwood\\_GW\\_discussion\\_10Dec2015.docx](#)  
[gw\\_20151009\\_EPA\\_final\\_comments.pdf](#)

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Hi All,

I wanted to update you on the status of the gw inquiries with EPA HQ.

The main dioxin colloidal gw contact has been on medical leave and is now gradually returning to work as he recovers.

Since this is the case, the current due date of Jan. 14, 2016 for gw responses will not be in effect as we resolve these issues.

Below is the last inquiry email I had sent to EPA HQ regarding our gw discussions. I received their first response yesterday and will forward that next.

Thanks,

Stephen L. Tzhone  
Superfund Remedial Project Manager  
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**From:** Tzhone, Stephen  
**Sent:** Monday, January 04, 2016 2:03 PM  
**To:** Berg, Marlene; Bartenfelder, David; Crumbling, Deana; Anderson, RobinM  
**Cc:** Sanchez, Carlos; Meyer, John  
**Subject:** RE: dioxin gw question; RE: colloid vs suspended solids (turbidity) - role in facilitated dioxin transport

Hi Marlene, Dave,

Dioxin gw clarifications are needed to proceed forward (see below for items summarized by Jim Fleer/McKesson and Scott Huling/EPA ORD).

Currently, McKesson has till Jan. 14, 2016 to respond to our Oct. 9, 2015 gw comments. Region 6 would be willing to extend the deadline as needed.

For reference, the recent Dec. 10, 2015 gw call notes is attached, as well as, our Oct. 9, 2015 gw comments.

Thanks,



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**From:** Fleer, James [<mailto:James.Fleer@McKesson.com>]  
**Sent:** Thursday, December 31, 2015 12:40 PM  
**To:** Tzhone, Stephen; Moix, Mark  
**Cc:** Huling, Scott; Harte, Philip; Telisak, Theodore; Snyder, Jay; Tom Aley;  
[shiloh@ozarkundergroundlab.com](mailto:shiloh@ozarkundergroundlab.com); Paul K. Scott  
**Subject:** RE: dioxin gw question; RE: colloid vs suspended solids (turbidity) - role in facilitated dioxin transport

Good morning Stephen and Mark,

In addition to the comments of Scott Huling, I believe there are additional considerations that need to be addressed. These considerations include:

1. What regulatory (or risk) standard will be applied to the various samples collected?  
Previous water samples from New Cricket Spring were sampled and analyzed without filtration. Samples were collected with stream flows of approximately 5 gallons per minute and 66 gallons per minute. The analytical results from the previous samples did not indicate significant interferences and TEQ concentrations were reported below 30 parts per quadrillion. The current discussion is to collect stream samples at the point of greatest turbidity resulting from a high flow condition (i.e., expected worst case conditions relative to prospective dioxin transport). These samples may be impacted by solids being washed from the system which will fall out as sediment when conditions are less turbulent. Sediment samples downstream from the treatment plant effluent were previously collected and reported (2012).
2. How will the potential impacts from off-Site soils (entrained in samples or "suspended" due to turbulent flow) be mitigated during this process? Seep/intermittent spring flows may be impacted from non-Site related soil sources including those related to the adjacent railroad tracks (potentially affected by a century of deteriorating creosote-soaked railroad ties (including an area used for staging a large number of used railroad ties along the spur line adjacent to the Site) and soot impacted by dioxins from incomplete combustion of diesel fuel or other fuels) and along the adjacent roadway (incomplete combustion of diesel and other fuels). Sediments incidentally entrained in samples, mobilized by turbulent overland flow, or mobilized by subsurface flows may adversely impact the collected samples.
3. As this process has been discussed, it appears contradictory to the incremental sampling methodology established for risk analysis relative to soils. In the soil process, the intent was to develop composite data so localized high and localized low concentrations did not skew the evaluation. As discussed, the intention of the high flow process is to identify the presumed maximum dioxin concentration. How will the EPA evaluate the data sets (the two prior data points and any data generated during the high flow event including seep and

ditch samples) developed relative to any potential risk conditions? During the soil evaluation process, we had a clear understanding of how the data would be evaluated relative to risk. We do not currently have any understanding of the risk analysis process other than potential comparison to a drinking water standard for the water component (which we believe is an inappropriate comparison for these high turbidity samples from sources considered inadequate as drinking water sources).

Thank you in advance for your consideration of these important aspects of the potential future planned work activity. If you have any questions, please let me know.

Best Regards,

***Jim***

**James Fleer**

Director, Environmental Services  
McKesson Corporation  
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**From:** Huling, Scott

**Sent:** Thursday, December 10, 2015 4:09 PM

**To:** Tzhone, Stephen

**Subject:** colloid vs suspended solids (turbidity) - role in facilitated dioxin transport

Stephen,

Here is the summary you requested. Hopefully I captured the three issues that pertained to this discussion.

The issue of colloids versus suspended solids and the role they play in the facilitated transport of dioxin and exposure pathways came up during the Arkwood SF site conference call. The three issues below pertain to the fact that the acceptance criteria for dioxin is "30 parts per quadrillion" and any error in sampling could exceed this very low level. Clarification on these matters are requested.

1. One issue involved whether there was a size dependent aspect of the facilitated transport of dioxin. Specifically, does the regulatory concern involve dioxin transport on colloids, which is defined as a specific range in particle size (i.e., 10-10,000 angstroms). Or does the regulatory requirement involve a broader range in particle size such as suspended solids (i.e., clay, silt, detritus, etc.) and other particles. These particles of varying size may be contaminated with dioxin could be derived from the subsurface system and emerge at springs and seeps. The interpretation inferred by the responsible parties is that regulatory concerns are restricted to colloidal transport of dioxin.

2. Another issue pertained to whether the ground water sample could be differentiated between colloids and “non-colloids”. Filtration was raised as a possible means to achieve this distinction. Preliminary input on this matter was that this would introduce uncertainty as it would physically remove colloids and other solid materials from the ground water sample without a clear distinction between colloids and “non-colloids”. The conventional wisdom is that filtration would remove solid matter of any size that is potentially contaminated with dioxin and consequently would negatively impact the quality of the sample.
3. The third issue involved whether the ground water sample collected at the spring, seep, etc. could possibly involve suspended materials (i.e., suspended solids) and could reflect an artifact of the sampling process (i.e., disturb the soil/sediment at the sampling location). General input was provided on this matter indicating that discretion should be exercised when collecting the sample so as not to acquire a sample that includes disturbed/suspended soil/sediment material. It was reported that this could be difficult when collecting a sample at a seep where there is not a clear portion of the water body to collect a sample.

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